AMENDMENTS TO CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A transmitting method in CDMA (Code Division Multiple Access) systems with a transmitting apparatus and receiving apparatus, comprising the steps of:
(a) generating a pilot signal and transmitting data signals for several channels with different information; (b) supplying a pair of the data signals to a complex multiplier and spreading ~~a complex valued signal composed of a pair of said signals using a~~ the pair of the data signals with complex orthogonal ~~code~~ codes to obtain complex valued first spread signals, and spreading additional said data signals with complex orthogonal codes to obtain second spread signals; (c) adding the first complex valued spread and the second signals; (d) scrambling the added complex valued signals ~~signals~~ using complex valued PN (Pseudo-Noise) sequences; (e) modulating the scrambled signals with a carrier; and (f) transmitting a composite signal created by adding the modulated signals.

2. (Previously Presented) A transmitting method as defined in claim 1, wherein complex spreading step and the complex scrambling step are arranged to improve the PAR (Peak-to-Average power Ratio) characteristic of the transmitter.

3. (Previously Presented) A transmitting method as defined in claim 2, wherein the second complex-domain scrambling codes ($C_{scramble,\,I}[n] + j\,C_{scramble,\,Q}[n]$) in the scrambling step are given by the following equations in terms of the primary scrambling codes ($C_1[n]$, $C_2[n]$):
(a) when the spreading data vary,

[EQUATION 37]

$C_{scramble,\,I}[n] + j\,C_{scramble,\,Q}[n] = C_1[n] + C_2[n]$; and

(b) when the spreading data do not vary,

[EQUATION 38]

$C_{scramble,\,I}[n] + j\,C_{scramble,\,Q}[n] = -C_2[n]\,C_{scramble,\,Q}[n-1]\,H_b[n-1]\,H_b[n] + j\,C_2[n]\,C_{scramble,\,I}[n-1]\,H_a[n-1]\,H_a[n]$.

4. (Previously Presented) A transmitting method as defined in claim 2, wherein the orthogonal complex-domain spreading is performed with Hadamard codes and the scrambling codes for the complex-domain scrambling are produced using orthogonal Hadamard codes.

5. (Previously Presented) A transmitting method as defined in claim 2, wherein the orthogonal complex-domain spreading is performed with Walsh codes and the scrambling codes for the complex-domain scrambling are produced using orthogonal Hadamard codes.

6. (Previously Presented) A transmitting method as defined in claim 2, wherein the orthogonal complex-domain spreading is performed with Gold codes and the scrambling codes for the complex-domain scrambling are produced using orthogonal Hadamard codes.

7. (Previously Presented) A receiving method in CDMA (Code Division Multiple Access) systems with a transmitting apparatus and receiving apparatus, comprising the steps of:
(a) demodulating the transmitted signal using the same carrier used in the transmitter; (b) de-scrambling the demodulated signal using the synchronized identical PN (Pseudo-Noise) sequences of the transmitter; (c) de-spreading the de-scrambled signal using the synchronized identical orthogonal codes of the transmitter for each channel; and (d) recovering the transmitted data from the de-spread ~~signals~~ signal.

8. (Original) A receiving method as defined in claim 7, wherein the de-scrambling step and the de-spreading step perform a complex-domain de-scrambling and an orthogonal complex-domain de-spreading.

9. (Original) A receiving method as defined in claim 8, wherein the complex-domain de-scrambling codes and the orthogonal complex-domain de-spreading codes are the same as those used in the complex-domain scrambling and the orthogonal complex-domain spreading of the transmitter.

10. (Previously Presented) A transmitting apparatus in CDMA (Code Division Multiple Access) systems with a transmitting apparatus and receiving apparatus, comprising:
(a) means for generating a pilot signal and transmitting data signals for several channels with different information; (b) means for controlling the signal-gains of the channels (c) means for spreading the gain-controlled signal for each channel; (d) a first complex-domain multiplying means for performing a first orthogonal complex-domain spreading with the input of the transmitting data of the supplementary channels and of the OVSF (Orthogonal Variable Spreading Factor) codes; (e) means for adding the output of the first complex-domain multiplying means and the spread signal; (f) a spreading modulator, comprising a complex-domain multiplier and a scrambling code generator, for modulating the added signal; (g) means for amplifying low-pass filtered signal power; (h) means for modulating the amplified signal to the desired frequency band; and (i) means for adding the modulated signal.

11. (Previously Presented) A receiving apparatus in CDMA (Code Division Multiple Access) systems with a transmitting apparatus and receiving apparatus, comprising:
(a) means for demodulating the transmitted signal from an antenna using the same carrier used in the transmitter; (b) a spreading de-modulator, comprising a scrambling code generator and complex-domain multiplying means, for de-scrambling the modulated signal; (c) means for de-spreading the de-scrambled signal to get the desired channel by integrating for the symbol period

proportional to the data rate of the corresponding channel; and (d) second complex-domain multiplying means for correcting the phase of the de-spread signal.

12. (Previously Presented) A receiving apparatus as defined in claim 11, wherein the carrier used in the demodulating means of step (a) in claim 11 include the same waves used in the transmitter.

AMENDMENTS TO SPECIFICATION

Unlike the previous transmitter as in FIG. 9, the transmitter according to the invention has an additional complex-domain multiplier ~~(145)~~ (142) shown in the left of FIG. 11a. The complex-domain multiplier ~~(145)~~ (142) takes the transmitting data($D_{SCH1}[[\frac{n}{SF_{SCH1}}]]$), ($D_{SCH2}[[\frac{n}{SF_{SCH2}}]]$) of SCH1 and SCH2 of statistically high transmitting power as the first inputs and takes the orthogonal OVSF codes ($H_{SCH1}[n]$, $H_{SCH2}[n]$) as the second inputs. And the first orthogonal complex-domain spreading occurs at the complex-domain multiplier ~~(145)~~ (142). Other gain-controller signals for PiCH, DCCH and FCH spread at the spreaders ((1120, 1122, 1128) with orthogonal OVSF codes (HpiCH[n], $H_{DCCH}[n]$, $H_{FCH}[n]$), and are delivered to the adders (130, 132) with the outputs ($S_I[n]$, $S_Q[n]$) of the complex-domain multiplier ~~(145)~~ (142). The outputs ($x_T[n]$, $y_T[n]$) of the adder (130,132) are given in EQUATION 31.